

## 2024 PDDC Plant Disease Talks

### Evil Twins: Plant Disease Look-Alikes

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### Evil Twins: Plant Disease Look-Alikes Oak Wilt

- Pathogen
  - *Bretziella fagacearum* (*Ceratocystis fagacearum*)
  - *Chalara* sp.
- Hosts
  - Red oak group: Red, black, pin
  - White oak group: White, bur, swamp white
  - Chinese chestnut

### Evil Twins: Plant Disease Look-Alikes Oak Wilt

- Favorable environment
  - Cool, wet conditions (for infection)
  - Hot, dry weather (for symptom development)



### Evil Twins: Plant Disease Look-Alikes Oak Wilt

- Transmission
  - Oak bark beetles
    - *Pseudopityophthorus ninutissimus*
    - *Pseudopityophthorus pruinosis*
  - Sap beetles
    - *Carpophilus* spp.
    - *Epuraea* spp.
    - *Colopterus* spp.
    - *Clischrochilus* spp.
    - *Cryptarcha* spp.

### Evil Twins: Plant Disease Look-Alikes Oak Wilt

- Transmission
  - Root grafts
    - Major method of movement in clumps of oaks
    - Commonly form between trees in the same group
      - Red oak group: Red, black, pin
      - White oak group: White, bur, swamp white
    - Rarely form between trees in different groups
    - Movement of up to 20-25 ft/year



### Evil Twins: Plant Disease Look-Alikes Oak Wilt

- **Control**
  - DO NOT prune or wound oaks from bud break through 2-3 weeks past full leaf development
  - Disrupt root grafts
    - “Oak Wilt Management” (<https://widnr.widen.net/s/nwf2cgskdn/fr-825-oak-wilt-management-fact-sheet>)
    - Mechanically (vibratory plow or trenching machine)
    - Chemically (soil fumigant)
    - Physical barriers

### Evil Twins: Plant Disease Look-Alikes Oak Wilt

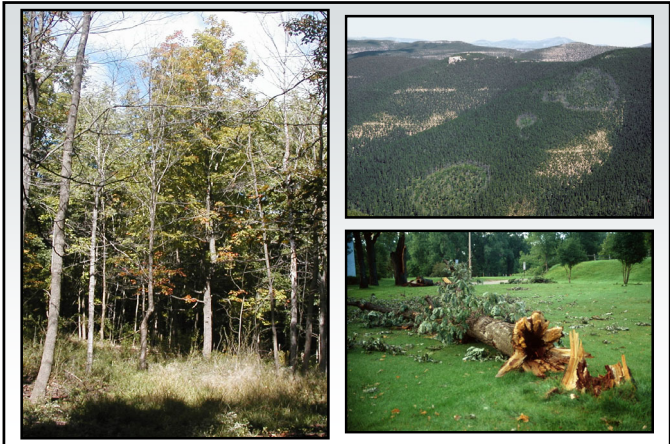
- **Control**
  - Remove diseased (and healthy) trees
  - Decontaminate pruning tools (70% alcohol, disinfectants, bleach)
  - Be careful using oak wood
    - Remove bark
    - Cover wood

### Evil Twins: Plant Disease Look-Alikes Oak Wilt

- **Control**
  - Use fungicide injections
    - Propiconazole
    - Prophylactic or therapeutic
    - Inject every 12-24 months

### Evil Twins: Plant Disease Look-Alikes Armillaria Root Disease

- **Pathogens:** *Armillaria* spp.
- **Hosts**
  - Many trees and shrubs
  - Some herbaceous plants
- **Favorable environment**
  - Drought stress
  - Defoliation stress
  - Other stresses





### Evil Twins: Plant Disease Look-Alikes Armillaria Root Disease

- **Control**
  - Reduce tree/shrub stress where possible
    - Water adequately
    - Fertilize properly
    - Control foliar pathogens
    - Control foliar insect pests
  - **DO NOT** wound trees
  - Remove *Armillaria*-infested materials
  - **DO NOT** use fungicides

### Evil Twins: Plant Disease Look-Alikes Root/Crown Rots

- **Pathogens**
  - *Pythium* spp.
  - *Rhizoctonia solani*
  - *Cylindrocarpon* spp.
  - *Phytophthora* spp.
  - *Fusarium* spp.
  - *Thielaviopsis* spp.
- **Hosts: Any plant**
- **Favorable environment: Cool, wet soils**



### Evil Twins: Plant Disease Look-Alikes Root/Crown Rots

- **Control**
  - **Moderate soil moisture**
    - Grow plants in well-drained sites
    - Use a potting mix with adequate drainage
    - Improve drainage in poorly drained soils
      - Add organic matter to improve drainage
      - Use raised beds
  - **DO NOT** overwater
  - **DO NOT** overmulch



### Evil Twins: Plant Disease Look-Alikes Root/Crown Rots

- Control
  - Pretest soils/mulches/composts
  - Use a soil-less potting mix or a pasteurized potting mix for containerized plants
  - DO NOT move contaminated soil or plants
  - Disinfect contaminated materials (70% alcohol, disinfectants, bleach)

### Evil Twins: Plant Disease Look-Alikes Root/Crown Rots

- Control
  - Use fungicides to prevent infections
    - Contract with a professional pesticide applicator
    - Etridiazole, metalaxyl, mefenoxam, fosetyl-AI, PCNB, thiophanate-methyl, fludioxonil
    - Alternate active ingredients (FRAC codes)
    - Use granular formulations if possible
    - Use during periods of wet weather

### Evil Twins: Plant Disease Look-Alikes Root/Crown Rots

- Control
  - Use biopesticides to prevent infections
    - *Trichoderma*, *Gliocladium*
  - Use for potted plants
  - Exercise caution when combining with chemical fungicides

### Evil Twins: Plant Disease Look-Alikes Southern Blight

- Pathogen: *Sclerotium rolfsii*
- Hosts
  - Any herbaceous plant
  - Some woody plants
- Favorable environment: Warm, wet weather



### Evil Twins: Plant Disease Look-Alikes Southern Blight

- Control
  - DO NOT buy infected/infested plants
  - Avoid cocoa mulch (?)
  - Remove infected plants, mulch and soil
    - Double bag and landfill
  - Disinfect contaminated materials (70% alcohol, disinfectants, bleach)

### Evil Twins: Plant Disease Look-Alikes Southern Blight

- Control
  - Amend soil with organic matter (?)
  - Allow affected areas to go fallow
  - Use fungicides for control
    - Contract with a professional pesticide applicator
    - Azoxystrobin, flutolanil, flutolanil + thiophanate-methyl, PCNB, tebuconazole, triadimefon
    - Alternate active ingredients (FRAC codes)
    - Apply at 14 – 28 day intervals
  - Pray for a really, really, REALLY cold winter

### Evil Twins: Plant Disease Look-Alikes Rhizosphaera Needle Cast

- Pathogens: *Rhizosphaera kalkhoffii*  
*Rhizosphaera* spp.
- Look-Alike: Stigmina Needle Cast (*Stigmina* spp.)
- Hosts (major)
  - Colorado blue spruce
  - Other spruces: Black, Engelmann, Serbian, Sitka, white (Black Hills)

### Evil Twins: Plant Disease Look-Alikes Rhizosphaera Needle Cast

- Hosts (minor)
  - Pines: Austrian, mugo, eastern white pine
  - Douglas fir
  - Hemlock
  - Balsam fir and other firs
- Favorable environment
  - Long periods of needle wetness
  - High humidity



### Evil Twins: Plant Disease Look-Alikes Rhizosphaera Needle Cast

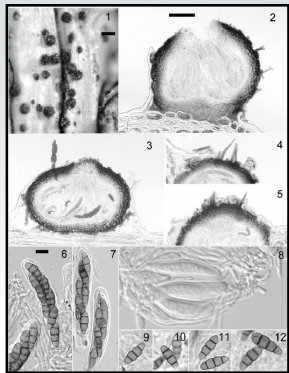
- Control
  - DO NOT plant Colorado blue spruce
  - DO NOT crowd trees when planting
  - Plant dwarf spruce varieties
  - Thin healthy branches to increase airflow
  - Prevent tree stress
  - Prune diseased branches

### Evil Twins: Plant Disease Look-Alikes Rhizosphaera Needle Cast

- Control
  - Decontaminate pruning tools (70% alcohol, disinfectants, bleach)
  - Use fungicides to prevent infections
    - Copper, chlorothalonil
    - Alternate active ingredients (FRAC Codes)
    - Start applications at bud break
    - Apply at 3-4 week intervals under favorable conditions

## Evil Twins: Plant Disease Look-Alikes Spruce Needle Drop

- Pathogen: *Setomelanomma holmii* (?)
- Hosts
  - Colorado blue spruce
  - Other spruces
- Favorable environment
  - Wet weather (?)
  - Stress (?)



From:  
 Rossman, A. Y., Farr, D. F., Castlebury, L. A., Shoemaker, R., and Mengistu, A. 2002. *Setomelanomma holmii* (Pleosporales, Phaeosphaeriaceae) on living spruce twigs in Europe and North America. *Can. J. Bot.* 80: 1209-1215.

## Evil Twins: Plant Disease Look-Alikes Spruce Needle Drop

- Control
  - Unclear
  - Prune diseased branches
  - Decontaminate pruning tools (70% alcohol, disinfectants, bleach)
  - Prevent tree stress
  - DO NOT use fungicides

## Evil Twins: Plant Disease Look-Alikes Fire Blight

- Pathogen: *Erwinia amylovora*
- Hosts
  - Many woody rosaceous plants
  - Apple, crabapple, pear, mountain ash, cotoneaster
- Favorable environment
  - Wet weather (but not too wet)
  - Hail (or other wounding)



## Evil Twins: Plant Disease Look-Alikes Fire Blight

- Control
  - Plant resistant varieties
    - “Home Fruit Cultivars for Northern Wisconsin” (<https://learningstore.extension.wisc.edu/>)
    - “Home Fruit Cultivars for Southern Wisconsin” (<https://learningstore.extension.wisc.edu/>)
    - “Top Ornamental Crabapples for Wisconsin” (<https://hort.extension.wisc.edu/>)
  - Prune diseased branches

## Evil Twins: Plant Disease Look-Alikes Fire Blight

- Control
  - Decontaminate pruning tools (70% alcohol, disinfectants, bleach)
  - Destroy infected materials
    - Burn (where allowed)
    - Deep bury
  - DO NOT over-fertilize with nitrogen

## Evil Twins: Plant Disease Look-Alikes Fire Blight

- Control
  - Use bactericides to prevent infections (?)
    - Copper, streptomycin
  - Apply
    - Pre-bloom (copper)
    - During flowering (streptomycin)
  - Apply every
    - Two applications at spaced 4 days apart (copper)
    - Multiple applications spaced 3-4 days apart (streptomycin)

## Evil Twins: Plant Disease Look-Alikes Bacterial Canker

- Pathogens
  - *Pseudomonas syringae* pv. *syringae*
  - *Pseudomonas syringae* pv. *mors-prunorum*
- Hosts: Stone fruits (plum, cherry, peach)
- Favorable environment
  - Wet weather
  - Cold temperatures
  - Wounding



## Evil Twins: Plant Disease Look-Alikes Bacterial Canker

- Control
  - Minimize wounding
  - Prune diseased branches
  - Decontaminate pruning tools (70% alcohol, disinfectants, bleach)
  - Destroy infected materials
    - Burn (where allowed)
    - Deep bury
  - DO NOT use bactericides

**Evil Twins: Plant Disease Look-Alikes**  
Tobacco Mosaic

- Pathogen: *Tobacco mosaic virus* (TMV)
- Hosts
  - Many herbaceous ornamentals
  - Many vegetables
- Favorable environment: None
- Transmission: Mechanical
  - Touch
  - Tools



**Evil Twins: Plant Disease Look-Alikes**  
Tobacco Mosaic

- Control
  - Buy plants from a reputable source
  - Inspect plants for symptoms
  - Test plants prior to purchase
  - DO NOT smoke around plants
  - Wash hands routinely with soap and water
  - Keep weeds under control
  - Landfill diseased plants and plant debris

**Evil Twins: Plant Disease Look-Alikes**  
Tobacco Mosaic

- Control
  - Disinfest contaminated materials
    - 1% Sodium dodecyl sulfate (sodium lauryl sulfate) + 1% Alconox® (2½ Tbsp + 2¼ Tbsp/gal)
    - Trisodium phosphate (14 dry oz/gal)
    - 20% low fat dry milk (Carnation®) + 0.1% polysorbate 20 (9½ cups + ¼ tsp/gal)
    - Alcohol dip followed by flaming
  - DO NOT use chemical controls on plants

**Evil Twins: Plant Disease Look-Alikes**  
Cucumber Mosaic

- Pathogen: *Cucumber mosaic virus* (CMV)
- Hosts
  - Many herbaceous ornamentals
  - Many vegetables
- Favorable environment: None
- Transmission
  - Insect (aphids)
  - Mechanical (contaminated tools)





## Evil Twins: Plant Disease Look-Alikes Cucumber Mosaic

- **Control**
  - Buy plants from a reputable source
  - Inspect plants for symptoms
  - Test plants prior to purchase
  - Keep weeds under control
  - Remove diseased plants and plant debris
    - Burn (where allowed)
    - Deep bury
    - Hot compost

## Evil Twins: Plant Disease Look-Alikes Cucumber Mosaic

- **Control**
  - Disinfest contaminated materials
    - 1% Sodium dodecyl sulfate (sodium lauryl sulfate) + 1% Alconox® (2½ Tbsp + 2¼ Tbsp/gal)
    - Trisodium phosphate (14 dry oz/gal)
    - 20% low fat dry milk (Carnation®) + 0.1% polysorbate 20 (9½ cups + ¼ tsp/gal)
    - Alcohol dip followed by flaming
  - **DO NOT** use chemical controls on plants
  - Consider insecticides for aphid control

## Evil Twins: Plant Disease Look-Alikes Herbicide Injury

- **Causes**
  - Growth regulator herbicides
    - 2,4-D
    - Dicamba
    - Imprelis!
  - Other herbicides
- **Affected plants:** Any plant



## Evil Twins: Plant Disease Look-Alikes Herbicide Injury

- **Management**
  - Apply herbicides only when needed
  - Follow application directions exactly
  - Apply herbicides only when wind speed is low (< 5 mph)
  - **DO NOT** apply herbicides too close to nontarget plants
  - Apply herbicides at low pressure

## Evil Twins: Plant Disease Look-Alikes Herbicide Injury

- **Management**
  - Use amine rather than ester forms of herbicides
  - Adequately test herbicides prior to registration!

**Evil Twins: Plant Disease Look-Alikes**  
**Where to Go for Help**

**Plant Disease Diagnostics Clinic  
Department of Plant Pathology  
University of Wisconsin-Madison  
1630 Linden Drive  
Madison, WI 53706-1598  
(608) 262-2863  
pddc@wisc.edu  
<https://pddc.wisc.edu>**

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